CLAIMS

1. A bicycle fitted with an on-board control system (23) and a first communication interface (20) electrically linked to the control system (23), said bicycle comprising at least one functional element (6a, 6b, 7a, 7b; 10, 11; 14, 15; 21, 22), **characterized in that** said control system is designed to:
   - control the state of the functional element (6a, 6b, 7a, 7b; 10, 11; 14, 15; 21, 22),
   - and communicate to a fixed infrastructure (2, 2c, 2d), via the first communication interface (20), status information concerning the state of said functional element (6a, 6b, 7a, 7b; 10, 11; 14, 15; 21, 22).

2. The bicycle as claimed in claim 1, in which said first communication interface comprises a transceiver (20).

3. The bicycle as claimed in claim 2, in which said first communication interface (20) is a short-range, contactless communication interface.

4. The bicycle as claimed in any one of the preceding claims, in which the control system (23) is designed to:
   - detect a fault in the operation of said functional element (6a, 6b, 7a, 7b; 10, 11; 14, 15; 21, 22), and
   - generate status information characteristic of said fault and communicate this status information to the first communication interface (20) for transmission to said infrastructure (2, 2c, 2d).

5. The bicycle as claimed in any one of the preceding claims, comprising a main rear lighting circuit (12) comprising a first rear lamp (10), the control system (23) being designed to:
- control said main rear lighting circuit (12), and
- detect a failure in said main rear lighting circuit (12).

6. The bicycle as claimed in claim 5, in which the main rear lighting circuit (12) comprises, in series, a current amplifier (30), a light-emitting diode (10), and a current detector (32).

7. The bicycle as claimed in claim 5 or claim 6, comprising a secondary rear lighting circuit (13) independent of the main rear lighting circuit (12), said secondary rear lighting circuit (13) comprising a second rear lamp (11), and in which the control system (23) is designed to control the secondary rear lighting circuit (13) by making it operate when a failure has been detected in the main rear lighting circuit (12).

8. The bicycle as claimed in any one of claims 5 to 7, comprising at least one brake (14, 15) and a secondary rear lighting circuit (13) independent of the main rear lighting circuit (12), said secondary rear lighting circuit (13) comprising a second rear lamp (11), the control system being designed to:
- detect the actuation of the brake (14, 15), and
- control the secondary rear lighting circuit (13) by making it operate when the actuation of the brake (14, 15) has been detected.

9. The bicycle (1) as claimed in either of claims 7 and 8, in which the secondary rear lighting circuit (13) comprises, in series, a current

amplifier (31), a light-emitting diode (11), and a current detector (33).

10. The bicycle as claimed in any one of the preceding claims, comprising at least one brake (14, 15) and a dynamo (21), and in which the control system (23) comprises a memory (24) and is designed to:
- detect an actuation of the brake (14, 15),
- measure an electrical intensity of a current generated by the dynamo (21),
- write to the memory (24) status information characteristic of a failure of the brake (14, 15) when the control system (23) detects the actuation of said brake (14, 15) without detecting a reduction in said electrical intensity,
- transmit said status information characteristic of a failure of the brake to the first communication interface (20).

11. The bicycle as claimed in any one of the preceding claims, comprising two independent front lighting circuits (8, 9), each comprising at least one front lamp (6a, 6b; 7a, 7b), and in which the control system (23) is designed to:
- supply current, at mid-power, to each front lighting circuit (8, 9),
- detect a failure in any one of the front lighting circuits (8, 9), and
- supply one of the front lighting circuits (8, 9) with current, at full power, when a failure has been detected in the other circuit.

12. The bicycle as claimed in claim 11, in which each front lighting circuit (8, 9) comprises, in series, a current amplifier (26, 27), at least one light-emitting diode (6a, 6b; 7a, 7b), and a current detector (28, 29).

13. The bicycle as claimed in any one of the preceding claims, comprising:
- at least one front lighting circuit (8, 9) comprising at least one front lamp (6a, 6b; 7a, 7b),
- at least one rear lighting circuit (12, 13) comprising a first rear lamp (10, 11),
- a dynamo (21),
- a battery (22) electrically linked to the dynamo (21) to be recharged by said dynamo and at least partly supplying the front and rear lighting circuits (8, 9, 12, 13),

in which the control system (23) is designed to:
- control the front and rear lighting circuits (8, 9, 12, 13),
- measure the battery charge (22),
- reduce an electrical intensity supplying the front lighting circuits (8, 9) when the measured charge is less than a predetermined minimum value.

14. The bicycle as claimed in any one of the preceding claims, comprising:
- at least one front lighting circuit (8, 9) comprising at least one front lamp (6a, 6b; 7a, 7b),
- at least one rear lighting circuit (12, 13) comprising a first rear lamp (10, 11),
- a dynamo (21),
- a battery (22) electrically linked to the dynamo (21) to be recharged by said dynamo and at least partly supplying the front and rear lighting circuits (8, 9, 12, 13),

in which the control system (23) comprises a clock (25) and is designed to:
- control the front and rear lighting circuits (8, 9, 12, 13),
- detect the operation of the dynamo (21),
- cut said front and rear lighting circuits (8, 9,

12, 13) when a time interval of predetermined duration has elapsed after the dynamo (21) has stopped operating.

15. The bicycle as claimed in any one of the preceding claims, in which the control system (23) comprises a memory (24) and is designed to:
- receive an identification code via the first communication interface (20),
- write said identification code into the memory (24),
- detect an operation of the bicycle (1),
- if the bicycle is operating, compare the value of the identification code with at least one predetermined value,
- and, depending on this comparison, initiate or not initiate an alarm reaction.

16. The bicycle as claimed in claim 15, in which the control system is designed to initiate the alarm reaction when the value of the identification code corresponds to said predetermined value.

17. The bicycle as claimed in any one of the preceding claims, in which the control system (23) comprises a clock (24) and is designed to:
- detect an operation of the bicycle (1),
- after a predetermined period of operation of the bicycle, initiate an alarm reaction.

18. The bicycle as claimed in any one of claims 15 to 17, comprising at least one lighting circuit (8, 9, 12, 13) which comprises at least one lamp, in which the control system (23) is designed to intermittently control the lighting circuit (8, 9, 12, 13) as an alarm reaction.

19. The bicycle as claimed in any one of claims 15 to 18, comprising a speaker (19) controlled by the

control system (23), and in which the control system (23) is designed to have a sound signal sent to this speaker (19) as an alarm reaction.

20. The bicycle as claimed in any one of claims 15 to 18, in which the control system is designed to detect a movement of the bicycle (1) and to determine that the bicycle is operating when a movement is detected.

21. The bicycle as claimed in any one of the preceding claims, which can be locked on a fixed terminal (2), in which the control system (23) is designed to:

- detect a locking of the bicycle (1) on a fixed terminal (2),
- have an acknowledgement signal sent when the locking of the bicycle (1) on the terminal (2) has been detected.

22. The bicycle as claimed in claim 21, comprising at least one lighting circuit (8, 9, 12, 13) controlled by the control system, and said control system is designed to have said lighting circuit operate intermittently for a limited period as an acknowledgement signal.

23. An automatic bicycle rental system comprising at least one bicycle (1) according to any one of the preceding claims and an infrastructure (2, 2c, 2d) designed to receive said status information.

24. The automatic system as claimed in claim 23, comprising a plurality of bicycles (1) and in which said infrastructure (2, 2c, 2d) comprises:

- a plurality of storage stations (2) designed to receive on each at least one bicycle (1) for storage purposes,
- and a plurality of short-range second

communication interfaces (2a) designed to communicate with said first communication interfaces (20) of the bicycles, each second communication interface (2a) of the infrastructure being associated with at least one storage station (2) and disposed in the immediate vicinity of said storage station.

25. The automatic system as claimed in claim 24, in which each storage station comprises a fixed terminal (2).

26. The automatic system as claimed in claim 25, in which the fixed terminal (2) comprises one of said second communication interfaces (2a).

27. The automatic system as claimed in any one of claims 23 to 26, in which said second communication interface (2a) is a contactless communication interface comprising a transceiver (2a).

28. The automatic system as claimed in any one of claims 23 to 27, in which the infrastructure also comprises at least one central station (2d), centralizing said status information received by all the second communication interfaces (2a).